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Breakers

EH 9

REPAIR MANUAL



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1. Foreword

For your own safety and protection from bodily injuries, carefully read, understand and follow the safety instructions in this manual.

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2. Safety instructions

for the use of drilling and breaking hammers with electric drive

2.1 General instructions

2.1.1 Drilling and breaking hammers may only be operated by persons who

- * are at least 18 years of age,
- * are physically and mentally fit for this job,
- * have been instructed in the operation of drilling and breaking hammers and proven their ability to do the job to the employer and
- * may be expected to carry out the job they are charged with carefully.

The persons must be assigned the job of operating drilling and breaking hammers by the employer.

2.1.2 Drilling and breaking hammers are to be applied for their proper use. Both the manufacturer's operating instructions and these safety instructions must be observed.

2.1.3 The persons charged with the operation of drilling and breaking hammers must be made familiar with the necessary safety measures relating to the machine. In case of extraordinary uses, the employer shall give the necessary additional instructions.

2.1.4 It is possible that these drilling and breaking hammers exceed the admissible sound level of 89 dB (A). According to the rules for the prevention of accidents regarding emission of noise, the employees have to wear ear protection if the sound level reaches 89 dB (A) or more.

2.1.5 This repair manual is intended for drilling and breaking hammers with 2 tool holder types.

2.2 Operation

- 2.2.1 The function of operation levers or elements is not to be influenced or rendered ineffective.
- 2.2.2 Make sure that the machine is connected only to voltage and frequency as indicated on its name plate. Choose correct cross section for extension cord. See calculation example and diagram included in this manual.
- 2.2.3 Before leaving the drilling and breaking hammers or going on breaks, the operator must switch off the machines, disconnect them from the electric mains and store them securely.
- 2.2.4 Wear safety goggles to avoid injuries to the eyes.
- 2.2.5 We recommend wearing suitable working gloves.
- 2.2.6 Wear protective shoes while working with drilling and breaking hammers.
- 2.2.7 Drilling and breaking hammers are always to be operated with both hands on the handles provided for this purpose.
- 2.2.8 When working with drilling and breaking hammers, especially when carrying out drilling jobs, the operator must be positioned securely, particularly when working on scaffolding and ladders.
- 2.2.9 Drilling and breaking hammers are to be guided in such a way that hand injuries caused by solid objects are avoided. When carrying out demolition jobs at elevated places, special care is required to prevent the machine and the operator from falling.
- 2.2.10 Avoid body contact with earthed components. When breaking through connecting passages, watch out for electric wires, gas pipes and other similar objects. No one may stay in the room to which a passage is broken through, since there is a danger of injury from falling stones and tools.
- 2.2.11 During operation the tool holder must be closed. Tools and tool holder must be checked for wear in order to guarantee the proper functioning of the holder.
- 2.2.12 The operation of this machine may cause broken-off pieces to be flung away. Therefore, during operation, no one except the operator is to come near the machine.

- 2.2.13 Drilling and breaking hammers have to be disconnected from the electric mains before changing tools.
- 2.2.14 The tools must always be in perfect condition.
- 2.2.15 Do not operate this machine in areas where explosions may occur.
- 2.2.16 Do not use the electric cable to pull or lift the machine. Do not remove the plug from the socket by pulling on the cable. Protect cable from heat, oil and sharp edges.
- 2.2.17 Electrical equipment and material may only be used if they comply with operational and local safety requirements. They must be in proper condition and this condition is to be maintained.
- 2.2.18 Do not expose electric tools to rain. Do not use electric tools in damp or wet surroundings.

2.3 Safety checks

- 2.3.1 Drilling and breaking hammers may only be operated with all safety devices installed.
- 2.3.2 Before starting operation, the operator has to check that all control and safety devices are functioning properly.
- 2.3.3 Before starting operation, the overload clutch of the drilling hammers must be checked for proper functioning.
- 2.3.4 Cables must be checked regularly for damage.
- 2.3.5 If defects on the safety devices or other defects impairing the operational safety of the drilling and breaking hammers are observed, the supervisor must be informed immediately.
- 2.3.6 If there are defects jeopardizing operational safety, the machine has to be switched off immediately.

2.4 Maintenance

- 2.4.1 Only use original spare parts. Modifications to this machine are subject to the express approval of Wacker. In case of non-observance, all liability shall be refused.
- 2.4.2 Disconnect the drilling and breaking hammer from the electric mains before carrying out maintenance and repair jobs.
- 2.4.3 Work on the electric parts of the machines may only be carried out by skilled technicians.
- 2.4.4 As soon as maintenance and repair jobs have been completed, all safety devices must be properly re-installed.

2.5 Transport

- 2.5.1 When drilling and breaking hammers are being transported in vehicles, precautions have to be taken to ensure that they do not slip or fall over.

2.6 Maintenance checks

- 2.6.1 According to the conditions and frequency of use, drilling and breaking hammers must be checked for safe operation at least once every 6 months by skilled technicians, such as those employed by Wacker service stations, and repaired if necessary.

Please observe the appropriate rules and regulations valid in your country.

3. Description

3.1 Application

- 3.1.1 The Wacker drilling and breaking hammer is used in structural and civil engineering, plant construction, concrete works, cast stone plants, foundries, by plumbing installation firms and municipalities. It is particularly suited for use on natural and cast stone, as well as for all types of brick- and stonework. A wide selection of easily interchangeable tools is available for drilling holes from 12 to 125 mm, for breaking, chiselling, digging, puddling, hammering, ramming and deburring.

3.2 Putting into operation

- 3.2.1 Attaching and removing the tool.
- 3.2.2 Pull mains plug out of electric socket.
- 3.2.3 Turn the tool until it audibly snaps in.
- 3.2.4 Lock using strong axial pressure.
- 3.2.5 Check to see if the tool is locked by pulling on the tool. The tool is able to move several centimeters axially in the tool holder.
- 3.2.6 To remove the tool push back the sleeve and pull out the tool.
- 3.2.7 Only use sharp tools with tool shanks in perfect condition. It is advisable to lightly grease or oil tool shanks and tool bushing to avoid dry running and premature excessive wear.
- 3.2.8 **Connection**
The electric hammer is powered by A.C. (single phase) (see technical data). A suitable plug is provided for connection.

3.3 During operation

- 3.3.1 Speed control
Turn the thumbwheel in the handle anticlockwise (-) as far as it will go = reduced hammer power (Operation at reduced power is necessary for spot drilling and for work on brittle material.) Turn the thumbwheel clockwise (+) = full power.
- 3.3.2 Handle system on tool holder (consisting of two handle pieces)
- 3.3.3 Offset handle
According to the application requirements, this handle can be turned perpendicularly to the tool shaft direction by approx. 270°. Loosen the clamping wheel to turn the handle. The handle can be adjusted in 22.5° steps by tightening the clamping wheel.
- 3.3.4 Radial handle
This handle can be either be screwed into the supplementary handle or attached to the side of the housing.
- 3.3.5 The complete handle system can additionally be turned 360° perpendicularly to the tool shaft direction. It must be tightened with the SW13 hexagonal bolt of the radial handle before starting any application (approx. 14 Nm).

4. Technical data
4.1 EH 9BL/230

		EH 9 BL/230
Item no.		0008429 ...
Length x width x height (without tool)	mm:	560 x 130 x 245
Operating weight (mass) without tool	kg:	10
Voltage	V:	220 - 240 1~
Current consumption	kW:	1,38
Minimum generator output requirement for single connection	kW:	3,3
Current consumption	A:	7,5
Frequency	Hz:	50 / 60
Percussion rate electronically adjustable	min ⁻¹ :	1300 - 2150
Special lubricating grease		Unirex N2 grease
Shank for breaking tools		Hexagonal SW 19 x 82.5
Power transmission percussion system		From motor via crank mechanism to air-percussion system
Drive motor		Frequency converter driven three-phase AC motor, with protective insulation
Single drill work	J:	19
Breaking output (concrete B25)	kg/h:	630
Sound pressure level at operator's station	L _{PA} :	93 dB(A)
The weighted effective acceleration value, determined according to ISO 8662, Part 1	m/s ² :	is 9.8

4.2 EH 9BLM 230

		EH 9 BLM 230
Item no.		0008732...
Length x width x height (without tool)	mm:	620 x 130 x 245
Operating weight (mass) without tool	kg:	10,7
Voltage	V:	220 - 240 1~
Current consumption	kW:	1,38
Minimum generator output requirement for single connection	kW:	3,3
Current consumption	A:	7,5
Frequency	Hz:	50 / 60
Percussion rate electronically adjustable	min ⁻¹ :	1300 - 2150
Special lubricating grease		Unirex N2 grease
Shank for breaking tools		SDS - max
Power transmission percussion system		From motor via crank mechanism to air-percussion system
Drive motor		Frequency converter driven three-phase AC motor, with protective insulation
Single drill work	J:	19
Breaking output (concrete B25)	kg/h:	630
Sound pressure level at operator's station	L _{PA} :	94 dB(A)
The weighted effective acceleration value, determined according to ISO 8662, Part 1	m/s ² :	is 9.8

Technical data

4.3 EH 9 BL/115 WC

		EH 9 BL/115 WC
Item no.		0008734 ...
Length x width x height (without tool)	mm:	560 x 130 x 245
Operating weight (mass) without tool	kg:	10
Voltage	V:	110 - 127 1~
Current consumption	kW:	1,2
Minimum generator output requirement for single connection	kW:	3,3
Current consumption	A:	13
Frequency	Hz:	50 / 60
Percussion rate electronically adjustable	min ⁻¹ :	1300 - 2150
Special lubricating grease		Unirex N2 grease
Shank for breaking tools		Hexagonal SW 19 x 82.5
Power transmission percussion system		From motor via crank mechanism to air-percussion system
Drive motor		Frequency converter driven three-phase AC motor, with protective insulation
Single drill work	J:	19
Breaking output (concrete B25)	kg/h:	630
Sound pressure level at operator's station	L _{PA} :	93 dB(A)
Sound power level	L _{WA} :	101 dB(A)
The weighted effective acceleration value, determined according to ISO 8662, Part 1	m/s ²	is 9.8

4.4 EH 9 BLM/115

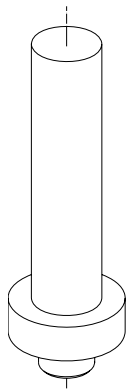
		EH 9 BLM/115
Item no.		0008738 ...
Length x width x height (without tool)	mm:	620 x 130 x 245
Operating weight (mass) without tool	kg:	10,7
Voltage	V:	110 - 127 1~
Current consumption	kW:	1,2
Minimum generator output requirement for single connection	kW:	3,3
Current consumption	A:	13
Frequency	Hz:	50 / 60
Percussion rate electronically adjustable	min ⁻¹ :	1300 - 2150
Special lubricating grease		Unirex N2 grease
Shank for breaking tools		SDS - max
Power transmission percussion system		From motor via crank mechanism to air-percussion system
Drive motor		Frequency converter driven three-phase AC motor, with protective insulation
Single drill work	J:	19
Breaking output (concrete B25)	kg/h:	630
Sound pressure level at operator's station	L _{PA} :	94 dB(A)
The weighted effective acceleration value, determined according to ISO 8662, Part 1	m/s ² :	is 9.8

Technical data

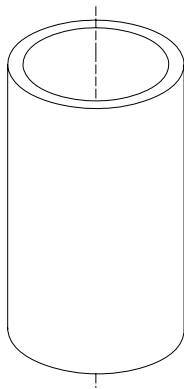
4.5 EH 9 BLM/115 WC

		EH 9 BLM/115 WC
Item no.		0008739 ...
Length x width x height (without tool)	mm:	620 x 130 x 245
Operating weight (mass) without tool	kg:	10,7
Voltage	V:	110 - 127 1~
Current consumption	kW:	1,2
Minimum generator output requirement for single connection	kW:	3,3
Current consumption	A:	13
Frequency	Hz:	50 / 60
Percussion rate electronically adjustable	min ⁻¹ :	1300 - 2150
Special lubricating grease		Unirex N2 grease
Shank for breaking tools		SDS - max
Power transmission percussion system		From motor via crank mechanism to air-percussion system
Drive motor		Frequency converter driven three-phase AC motor, with protective insulation
Single drill work	J:	19
Breaking output (concrete B25)	kg/h:	630
Sound pressure level at operator's station	L _{PA} :	94 dB(A)
Sound power level	L _{WA} :	106 dB(A)
The weighted effective acceleration value, determined according to ISO 8662, Part 1	m/s ²	is 9.8

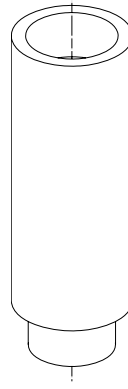
5. Special tools



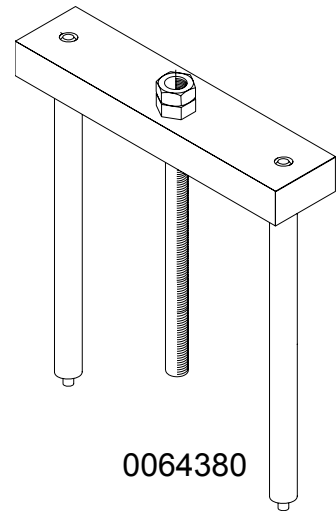
0015108



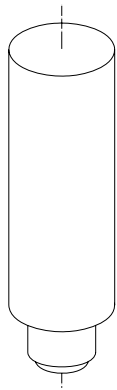
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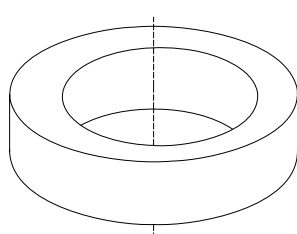
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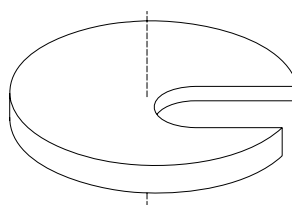
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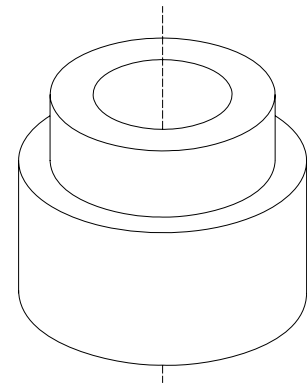
0064986



6500021



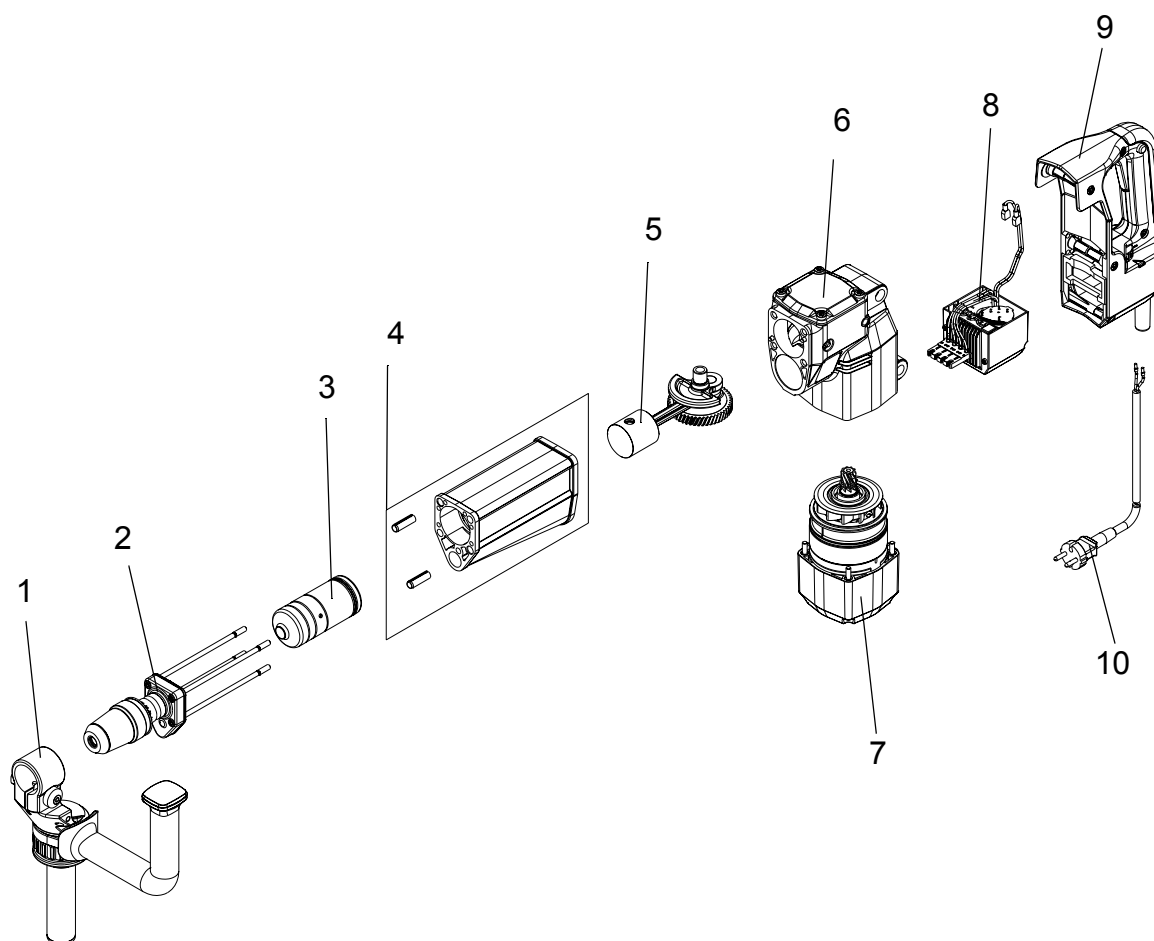
0049773



0049775

Item	Designation
0015108	Striking pin
0044738	Pipe
0049773	Disc
0049774	Pipe
0049775	Support
0064380	Extractor
0064986	Bolt
6500021	Ring

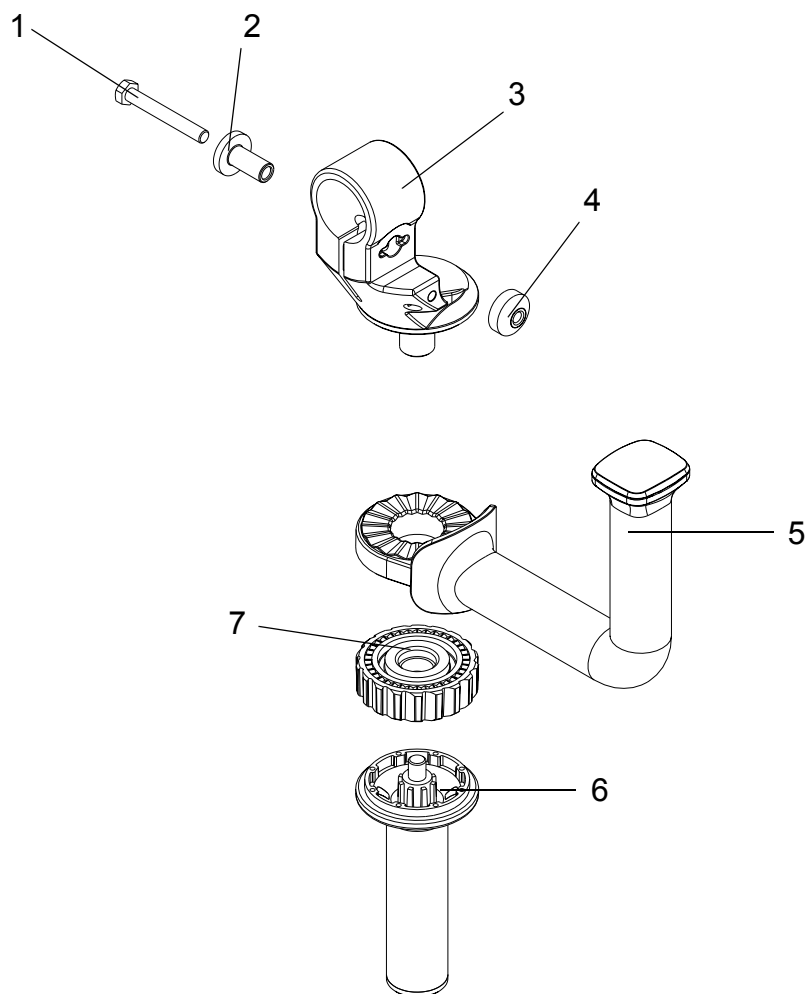
6. Disassembly / Assembly



Item Designation

- | | |
|----|-----------------------|
| 1 | Supplementary handle |
| 2 | Tool holder cpl. |
| 3 | Percussion piston |
| 4 | Cylinder housing |
| 5 | Crank mechanism cpl. |
| 6 | Crankcase cpl. |
| 7 | Motor |
| 8 | Inverter |
| 9 | Handle |
| 10 | Power cable with plug |

6.1 Disassembly of supplementary handle (SDS-max)



Item	Designation
1	Hexagonal bolt
2	Bushing
3	Clamping piece
4	Clamping sleeve
5	Offset handle
6	Radial handle
7	Clamping wheel

- 6.1.1 Before the handle can be completely disassembled, the steps from Chapter 6.5, Disassembly of the tool holder (SDS-max), must be carried out.
- 6.1.2 Unscrew handle (item 6). There is a key in the shaft for unscrewing the hexagonal bolt (item 1)

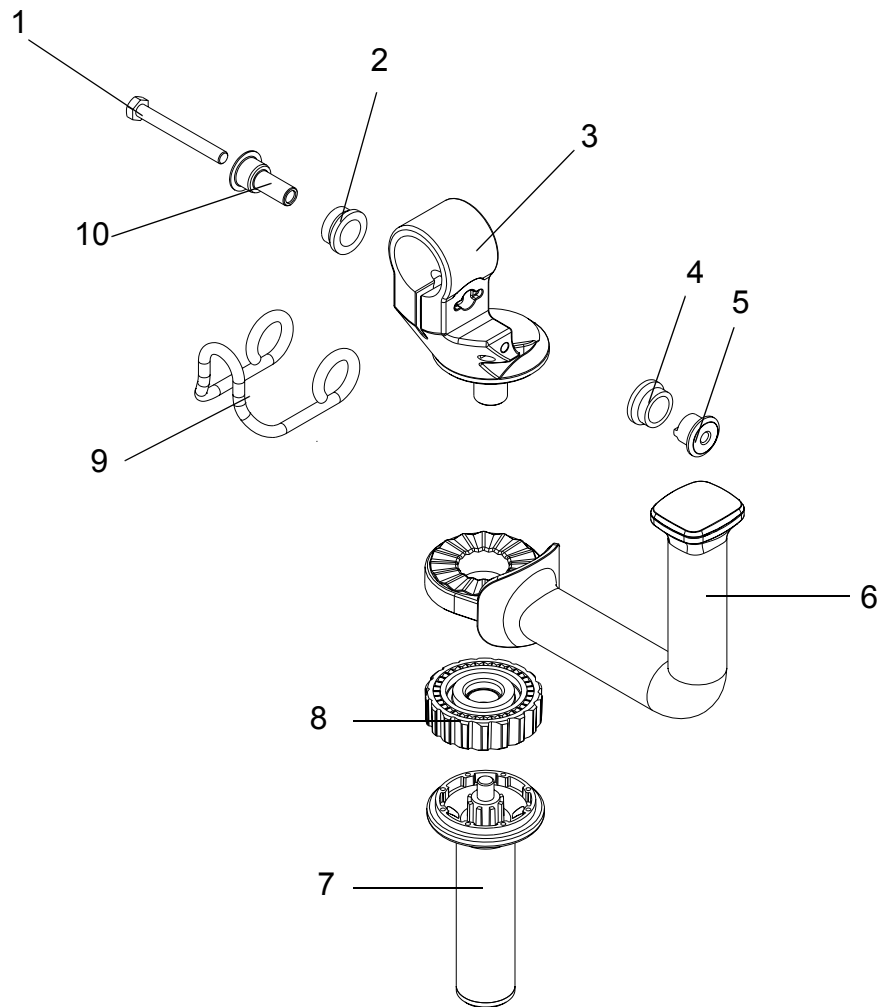


- 6.1.3 Release the hexagonal bolt (item 1) and pull it out of the clamping piece (item 3). This also removes the bushing (item 2) and the clamping sleeve (item 4).
- 6.1.4 The clamping piece (item 3) can be removed via the tool holder bushing. Turn the clamping wheel (item 7) and remove the offset handle (item 5).

6.2 Assembly of supplementary handle (SDS-max)

- 6.2.1 Once the defective parts have been replaced, assembly proceeds according to the following steps.
- 6.2.2 Slide the clamping piece (item 3) over the tool holder bushing.
- 6.2.3 The clamping piece (item 3) is locked with the hexagonal bolt (item 1), bushing (item 2) and clamping sleeve (item 4). The radial handle (item 6) is used to fasten the hexagonal bolt (item 1). Check for 14 Nm with the torque wrench.
- 6.2.4 The offset handle (item 5) and the clamping wheel (item 7) can be unscrewed. Screw both parts into the clamping piece (item 3) with the radial handle (item 6).

6.3 Disassembly of supplementary handle (hex 19x82.5mm)



Item	Designation
1	Hexagonal bolt
2	Damping ring
3	Clamping piece
4	Damping ring
5	Clamping sleeve
6	Offset handle
7	Radial handle
8	Clamping wheel
9	Holding spring
10	Bushing

- 6.3.1 Unscrew handle (item 7). There is a key in the shaft for unscrewing the hexagonal bolt (item 1).

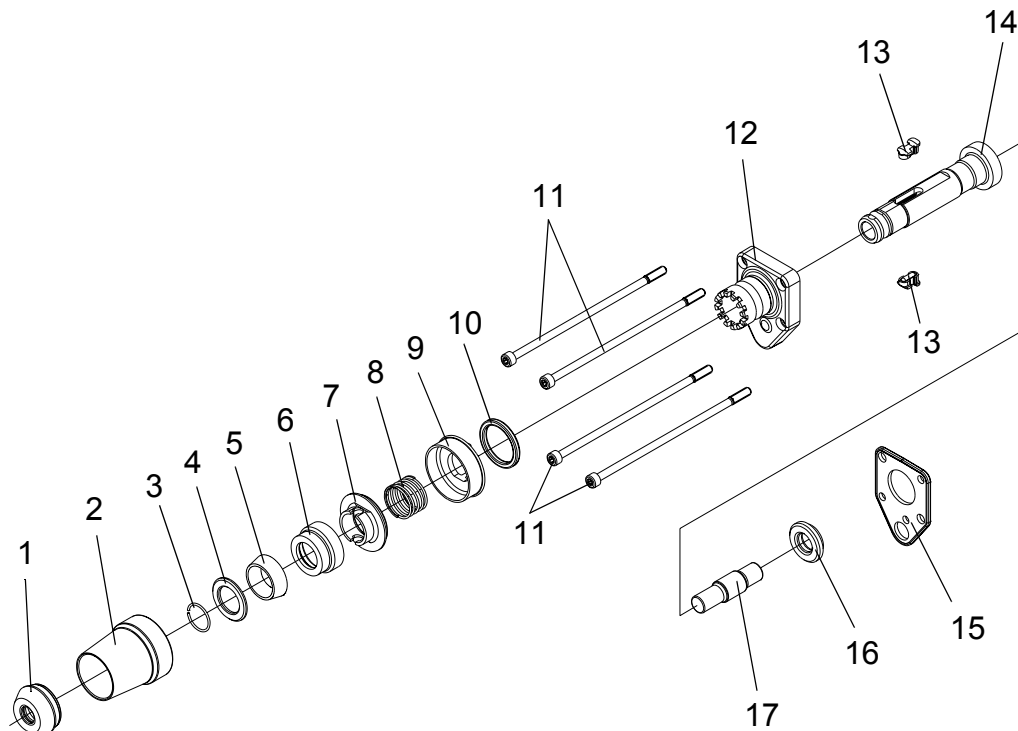


- 6.3.2 Release the hexagonal bolt (item 1) and pull it out of the clamping piece (item 3). This also removes the bushing (item 10), the holding spring (item 9), the clamping sleeve (item 5) and both damping rings (items 2 & 4).
- 6.3.3 The clamping piece (item 3) can be removed via the tool holder bushing. Turn the clamping wheel (item 8) and remove the offset handle (item 6).

6.4 Assembly of supplementary handle (hex 19x82.5 mm)

- 6.4.1 Once the defective parts have been replaced, assembly proceeds according to the following steps.
- 6.4.2 Slide the clamping piece (item 3) over the tool holder bushing.
- 6.4.3 The clamping piece (item 3) is locked with the hexagonal bolt (item 1), bushing (item 10), holding spring (item 9), both damping rings (items 2 & 4) and clamping sleeve (item 5). The radial handle (item 7) is used to fasten the hexagonal bolt (item 1). Check for 14 Nm with the torque wrench.
- 6.4.4 The offset handle (item 6) and the clamping wheel (item 8) can be unscrewed. Screw both parts into the clamping piece (item 3) with the radial handle (item 7).

6.5 Disassembly of tool holder (SDS-max)



Item Designation

1	Rubber cap
2	Sleeve
3	Snap ring
4	Disc
5	Damping ring
6	Locking sleeve
7	Holder
8	Compression spring
9	Adjusting ring
10	Seal
11	Cheese head screw
12	Tool holder
13	Lock

Item Designation

14	Tool holder bushing
15	Intermediate plate
16	Support
17	Intermediate piston

- 6.5.1 Carefully remove rubber cap (item 1) from tool holder.



- 6.5.2 Remove sleeve (item 2).



- 6.5.3 Remove snap ring (item 3). Disassembly can be carried out with assembly pliers for snap rings. (Hoffmann tool catalog 71 9960).



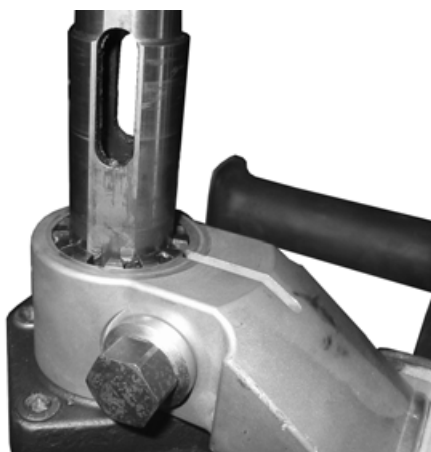
Caution: Once the snap ring has been disassembled, the remaining parts of the tool holder are under spring tension without safeguarding. The parts can be flung away from the tool holder!

Danger of injury!

- 6.5.4 The disc (item 4), damping ring (item 5) and locking sleeve (item 6) can be removed from the tool holder (item 14).
- 6.5.5 Press down the holder (item 7) and remove the lock (item 13, both parts).



- 6.5.6 Remove the holder (item 7), compression spring (item 8) adjusting ring (item 9) and seal (item 10) from the tool holder bushing (item 14).
- 6.5.7 Disassemble supplementary handle (see Chapter 6.1).



- 6.5.8 The individual components of the tool locking device have been disassembled, the tool holder (item 12) and tool holder bushing (item 14) can be disassembled.



- 6.5.9 Release the 4 cheese head screws (item 11) with the hexagon socket screw key (TX 40) and pull them out. Remove tool holder (item 12) from housing. Remove tool holder bushing (item 14).

Caution: The intermediate piston (item 17) may stick in the tool holder bushing (item 14) and fall out!
Cylinder housing may fall down!

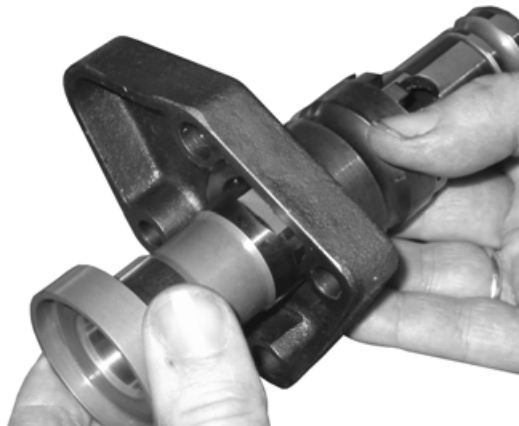
- 6.5.10 The intermediate plate (item 15) is fixed by means of a pin and can be removed from the tool holder (item 12).
- 6.5.11 Remove support (item 16) from tool holder bushing.

Note: The pin can become worn (see Chapter 11, Maintenance).

6.6 Assembly of tool holder (SDS-max)

6.6.1 Once the defective parts have been replaced, assembly proceeds in the reverse order to disassembly.

6.6.2 Insert tool holder bushing (item 14) in the tool holder (item 12).



6.6.3 Place support (item 16) and idler gear (item 17) in the tool holder. Follow the indicated assembly procedure.

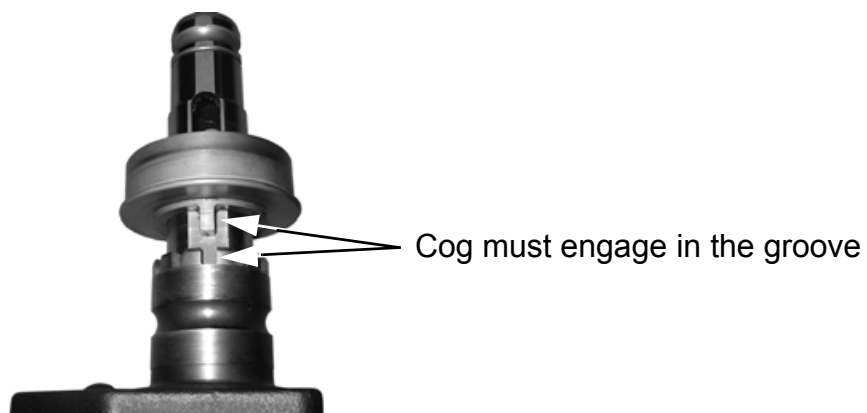


6.6.4 When it has been assembled, the unit consisting of items 12, 14, 17 and 16 should appear as it does in the illustration.



6.6.5 Attach the tool holder to the cylinder housing with the intermediate plate (item 15).

- 6.6.6 Using the 4 cheese head screws (item 11), attach the tool holder (item 12) with the parts described above to the cylinder housing (torque 25 Nm).
- 6.6.7 Attach supplementary handle (see Chapter 6.2).
- 6.6.8 Slide the seal (item 10), adjusting ring (item 9), compression spring (item 8) and holder (item 7) over the tool holder bushing (item 14). Make sure the adjusting ring (item 9) is attached correctly.



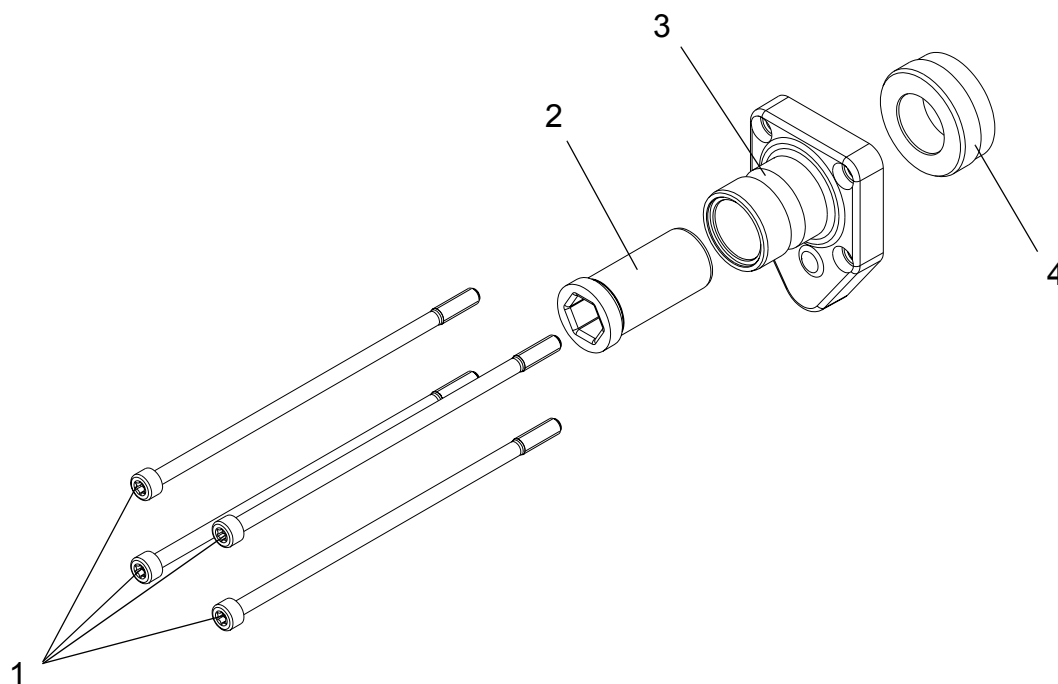
- 6.6.9 Press down the holder (item 7) and assemble both parts of the lock (item 13).



Caution: After the lock (item 13) and the compression spring (item 8) have been fitted, the installed parts of the tool holder (item 12) are subject to spring pressure without safeguarding. The parts can be flung away from the tool holder (item 12)!

- 6.6.10 Attach the locking sleeve (item 6), damping ring (item 5) and the disc (item 4). Secure mounted parts immediately with the snap ring (item 3). Assembly can also be carried out with assembly pliers for snap rings (Fa. Hoffmann tool catalog 71 9960).
- 6.6.11 Install sleeve (item 2) and rubber cap (item 1).



6.7 Disassembly of tool holder (hex 19x82.5 mm)

Item	Designation
1	Cheese head screw
2	Tool holder bushing
3	Tool holder
4	Stop sleeve

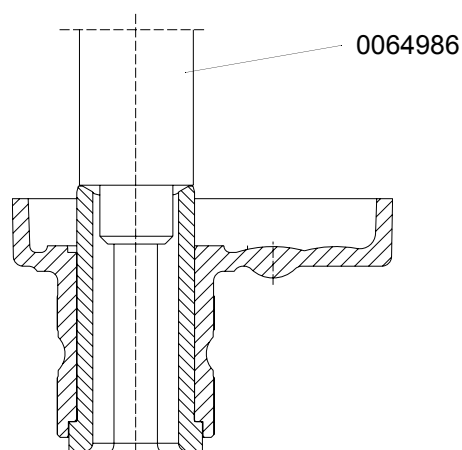
- 6.7.1 Release the 4 cheese head screws (item 1) with the hexagon socket screw key (TX 40) and pull them out.



- 6.7.2 Release and remove tool holder (item 3). The tool holder bushing (item 2) and stop sleeve (item 4) are pressed into the tool holder.

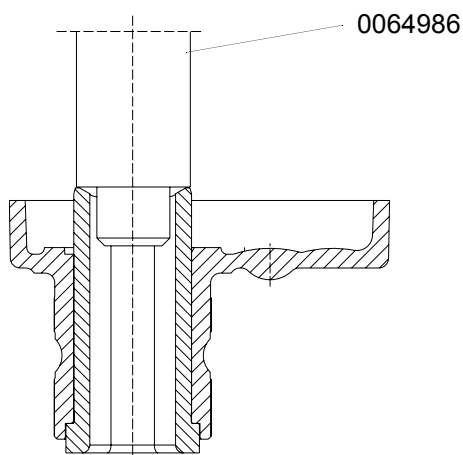


- 6.7.3 If the tool holder bushing (item 2) is worn (maintenance check, see 11.2.4), press out the tool holder bushing (item 2) with stop sleeve (item 4) using jig (0064986 bolt). Remove stop sleeve (item 4).



6.8 Assembly of tool holder (hex 19x82.5 mm)

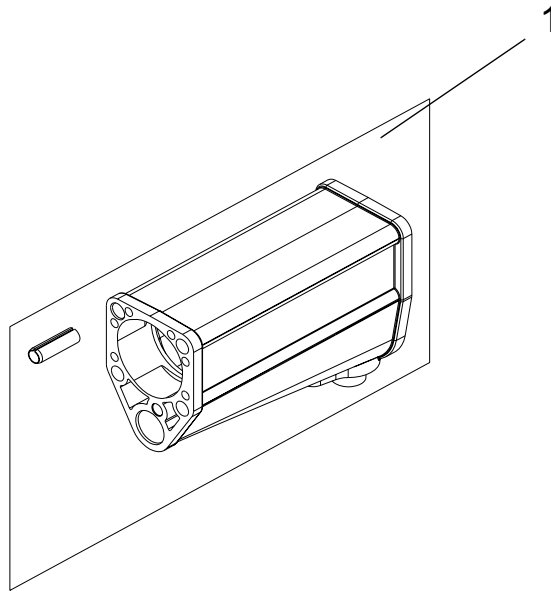
- 6.8.1 Once the defective parts have been replaced, assembly proceeds in the reverse order.
- 6.8.2 If the tool holder bushing (item 2) has been disassembled, press in the tool holder bushing (item 2) with jig (0064986 bolt) as far as it will go.



- 6.8.3 Press on stop sleeve (item 4).

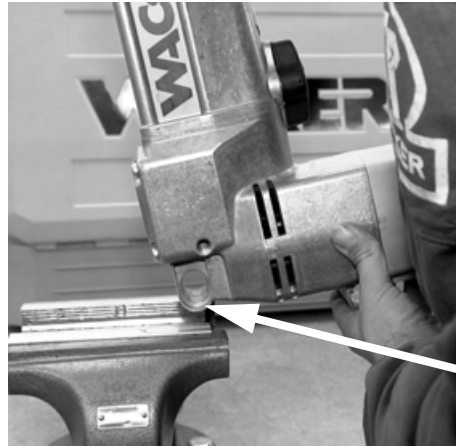


6.9 Disassembling the cylinder housing



Item	Designation
1	Cylinder housing

- 6.9.1 Clamp the hammer in the vise. It may only be clamped at the point intended for this purpose. Use "soft" aluminium clamping jaws. The lugs are for attaching the handle and may not be damaged.



Clamp hammer here

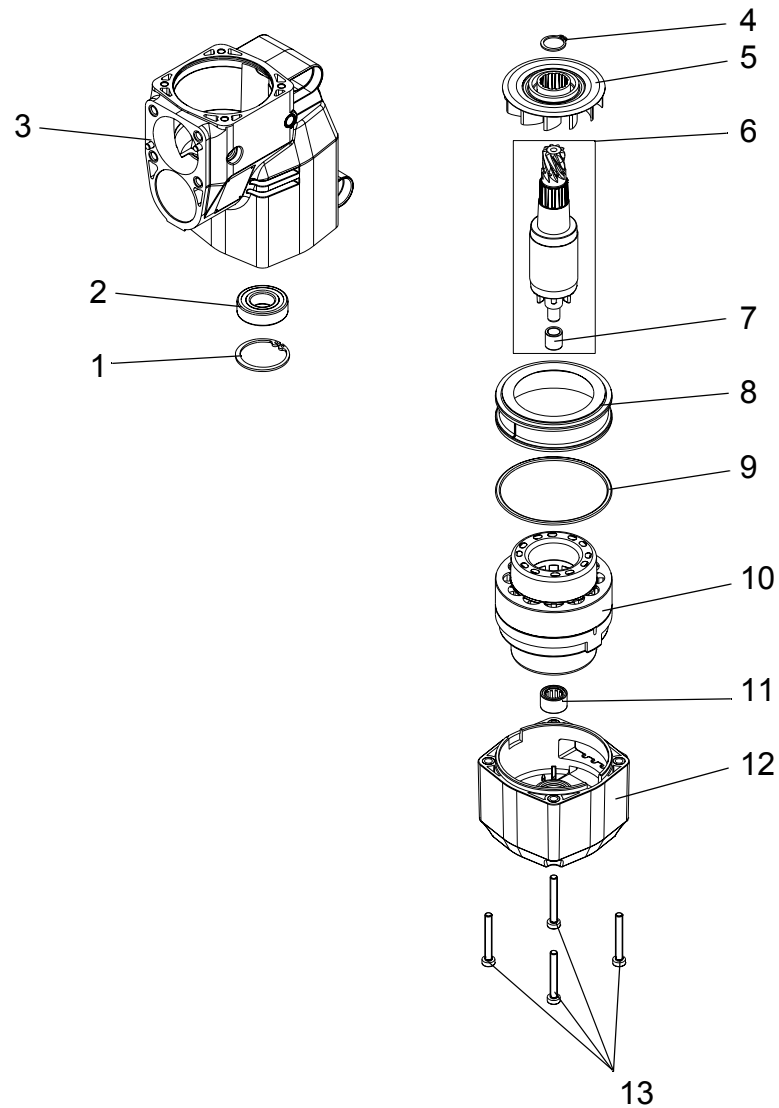
- 6.9.2 Depending on the tool holder mounted on the machine, carry out the steps described in chapter 6.5 or 6.7 to disassemble the tool holder. Remove the cylinder housing (item 1). The cylinder housing (item 1) is sealed to the crankcase. During disassembly the sealant can cause sticking.



6.10 Assembling the cylinder housing

- 6.10.1 Replacement of the pin in the cylinder housing (item 1) is described in Chapter 11, Maintenance.
- 6.10.2 Push the cylinder housing (item 1) over the percussion piston and attach to the crankcase.
- 6.10.3 The surface between cylinder housing (item 1) and crankcase is sealed using a sealant. See Chapter 8.3, Sealants.
- 6.10.4 The respective tool holder can be re-attached. See section 6.6 or 6.8.

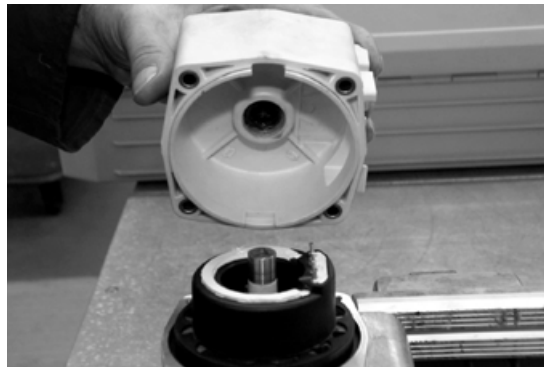
6.11 Disassembly of motor



Item Designation

1	Retaining clip	10	Stator
2	Deep groove ball bearing	11	Needle bearing
3	Crankcase	12	End shield
4	Retaining clip	13	Screw
5	Fan wheel		
6	Rotor		
7	Inner ring		
8	Air conductor sleeve		
9	O-ring		

- 6.11.1 First carry out the instructions in section 6.15, Disassembly of handle and inverter.
- 6.11.2 Release the 4 screws (item 13) with hexagon socket screw key (TX 40) and remove end shield (item 12).



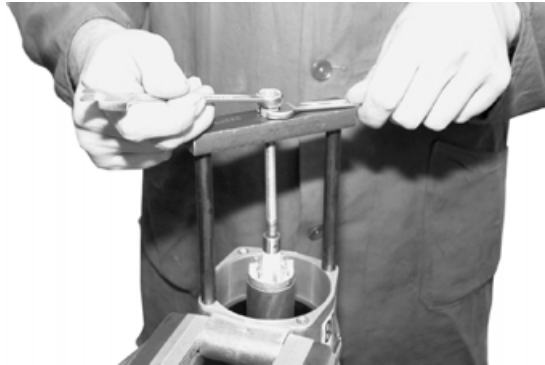
- 6.11.3 Pull out stator (item 10). On older machines the stator (item 10) may stick; if this is the case, use a strap wrench (0094654).



- 6.11.4 Remove O-ring (item 9) and air conductor sleeve (item 8). Parts are placed separately in crankcase.



- 6.11.5 Remove retaining clip (item 4) from the rotor shaft (item 6) using pliers. Use jig (extractor 0064380, modified pin) to pull rotor (item 6) and fan wheel (item 5) out of the crankcase. The inner ring (item 7), which is positioned on the rotor shaft, is also removed.



- 6.11.6 Using a hand press, the fan wheel (item 5) can be separated from the rotor (item 6) with the jig (ring 650021).
- 6.11.7 If the needle bearing (item 11) is defective, the needle bearing (item 11) is pulled out of the end shield (item 12) with a jig (2-arm extractor, e.g. kukko 21/2).

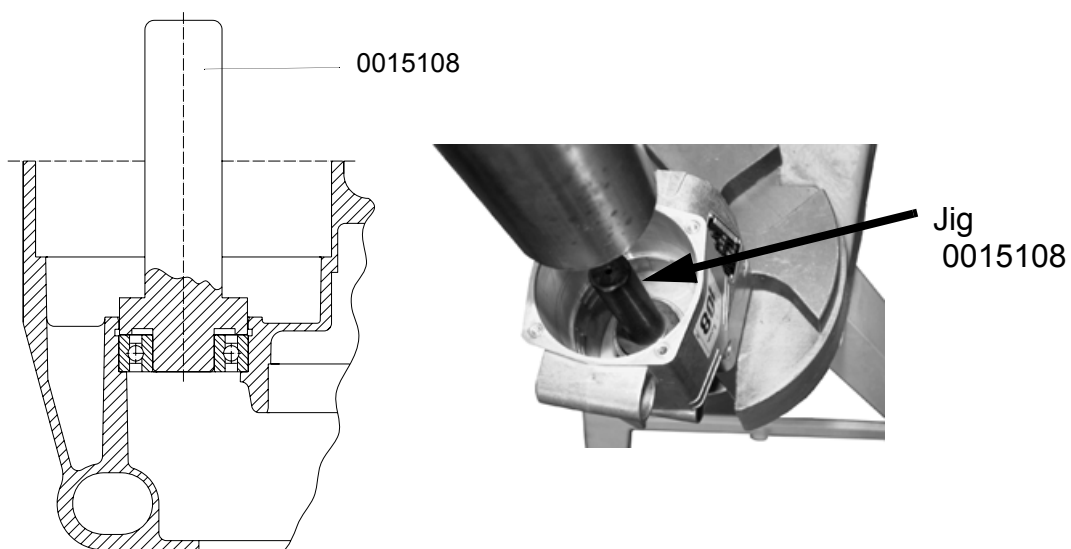


- 6.11.8 Remove retaining clip (item 1) with pliers. Pull out deep groove ball bearing (item 2) with jig (2-arm extractor, e.g. kukko 21/5).

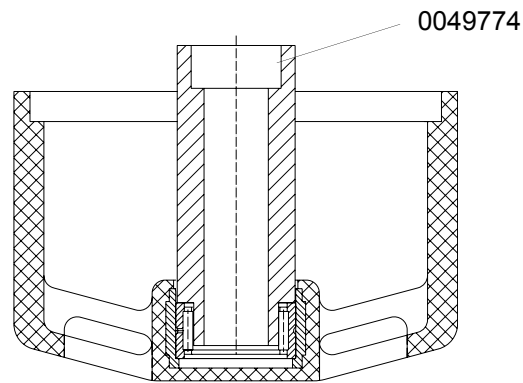


6.12 Assembly of motor

- 6.12.1 Once the defective parts have been replaced, assembly proceeds according to the following steps.
- 6.12.1 Press deep groove ball bearing (item 2) with jig (bolt 0015108) into the crankcase (item 3) with hand press. Make sure the base is even. Insert retaining clip (item 1) using pliers.

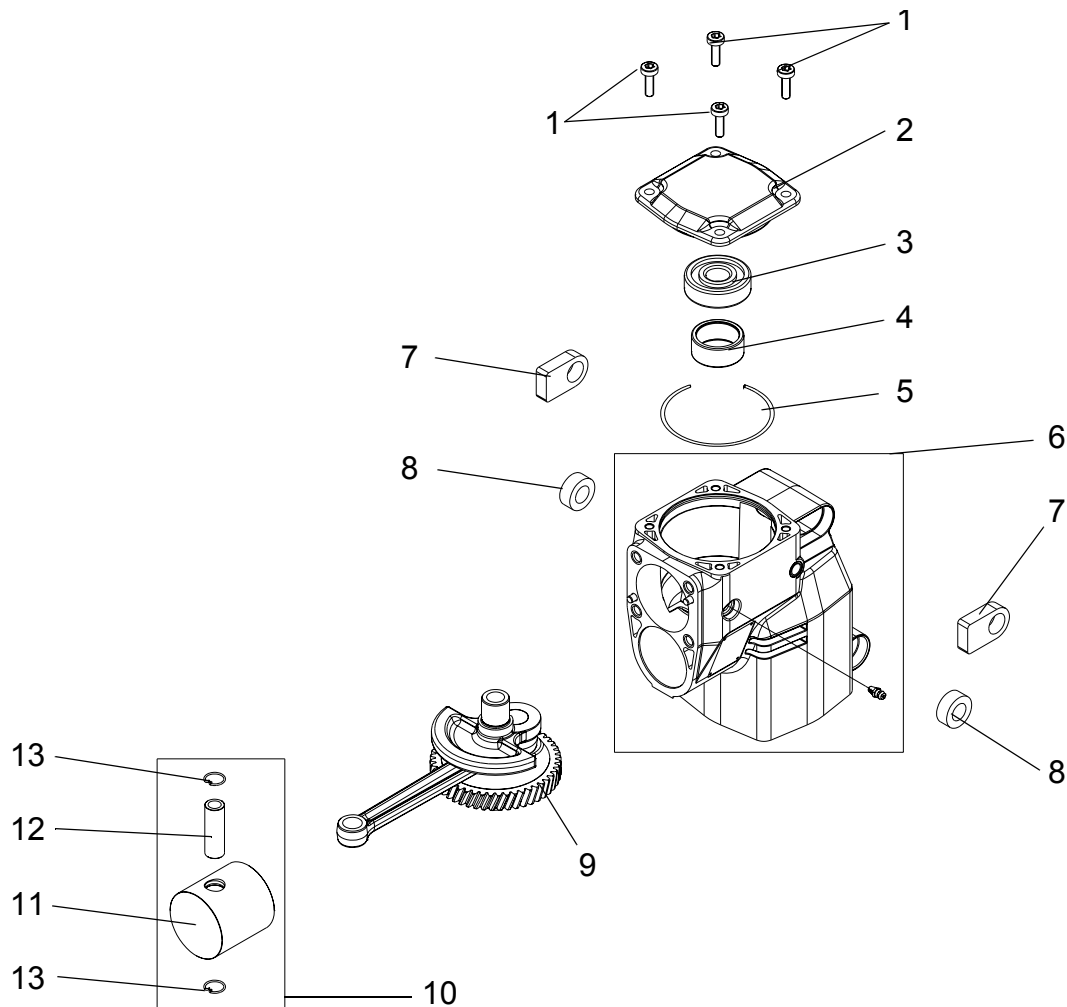


- 6.12.2 Use jig (pipe 0044738) under a hand press to press the fan wheel (item 5) onto the rotor (item 8).
- 6.12.3 Press the rotor (item 6) with fan wheel (item 5) into the crankcase (item 3) or deep groove ball bearing (item 2). Insert retaining clip (item 4).
- 6.12.4 Insert air conductor sleeve (item 8), O-ring (item 9) and stator (item 10).
- 6.12.5 If the needle bearing (item 11) in the end shield (item 12) has been removed, press it in with the jig (pipe 0049774) and hand press.



- 6.12.6 Attach end shield. Fasten screws (item 4) with 10 Nm.
- 6.12.7 First carry out the instructions in section 6.16, Assembly of handle and inverter.

6.13 Disassembly of crankcase



Item Designation

1	Fillister head screw	10	Guide piston cpl.
2	Bearing cover	11	Guide piston
3	Deep groove ball bearing	12	Piston pin
4	Needle sleeve	13	Wire snap ring
5	O-ring		
6	Crankcase		
7	Damping support		
8	Damping ring		
9	Crank mechanism		

- 6.13.1 Before the crankcase can be dismantled, the steps for dismantling the attached tool holder (sections 6.5 or 6.7) must be carried out.
- 6.13.2 After that, the steps for dismantling the cylinder housing (section 6.9) must be carried out.
- 6.13.3 Remove percussion piston from guide piston (item 11).

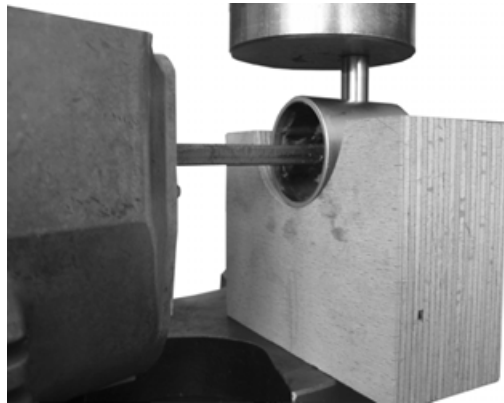


- 6.13.4 Remove wire snap rings (item 13) with pliers.



- 6.13.5 Press out piston pin (item 12).

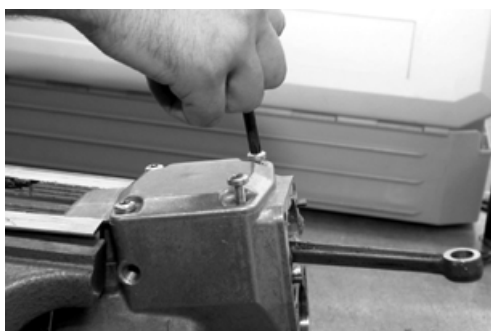
Caution: When pressing out the piston pin (item 12), do not apply any pressure to the connecting rod, as that will destroy it!
Position guide pistons (item 11) evenly and press the piston pins (item 12) out with a hand press.



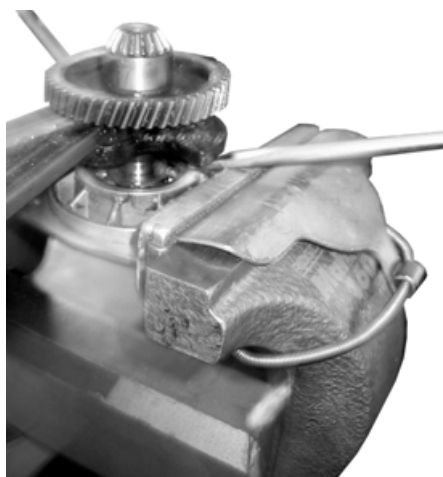
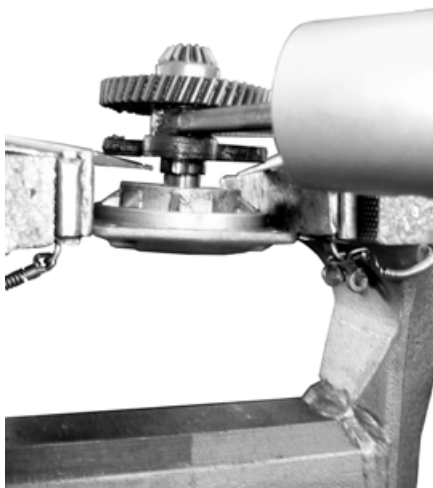
6.13.6 Remove the guide pistons (item 11).

6.13.7 Release the four fillister head screws (item 1) (TX 40) and remove them. Turn and remove the bearing cover (item 2) with the crank mechanism (item 9). If the bearing cover (item 2) is stuck in the housing, loosen the bearing cover with a rubber mallet (item 2).

6.13.8 The entire crank mechanism (item 9) can be removed. Hammers of the 101 series have an O-ring (item 5) under the bearing cover for sealing. Remove it.



- 6.13.9 In order to replace the deep groove ball bearing (item 3), the bearing cover (item 2) must first be removed. To do this, clamp the entire crank mechanism (item 9) in the vise with "soft" aluminium clamping jaws. Insert 2 large screwdrivers between bearing cover (item 2) and crank mechanism (item 9) and carefully press the crank mechanism (item 9) upwards. Adjust if necessary to prevent cant. Support for both screwdrivers is provided by the vise. The crank mechanism (item 9) is released from the bearing cover (item 2).



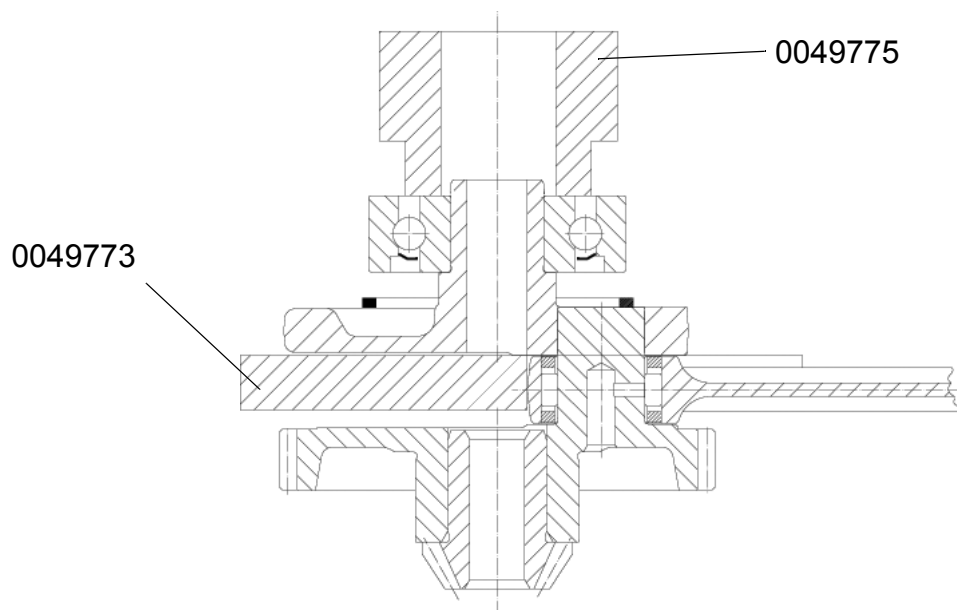
- 6.13.10 Remove deep groove ball bearing (item 3) from crank mechanism (item 9) with 2-arm extractor.
- 6.13.11 Remove needle sleeve (item 4) with jig (2-arm extractor and e.g. kukko 21/5).



- 6.13.12 Remove the damping support (item 7) and damping ring (item 8) from the housing if they are defective.

6.14 Assembly of crankcase

- 6.14.1 Turn housing around and press needle sleeve (item 4) with jigs (support 0049775 and disc 0099773) under a hand press as far as it will go.
- 6.14.2 In order to press the deep groove ball bearing (item 3) onto the crank mechanism (item 9), the crank mechanism must be professionally installed under a hand press. Create an even base using parallel strips. Press on deep groove ball bearing (item 3).



- 6.14.3 Carefully press bearing cover (item 2) onto the deep groove bearing (item 3). Make sure the base is even; use parallel strips.

Note: Bearing cover is a cast part - do not cant when pressing!

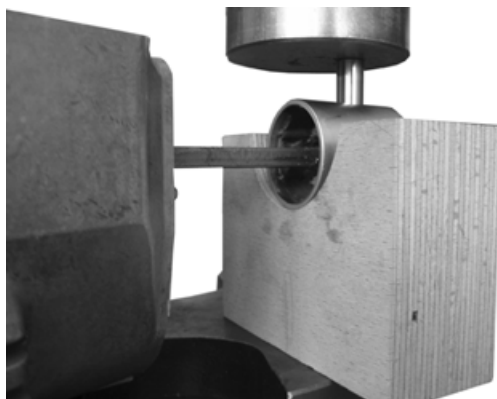
- 6.14.4 Pull up the O-ring (item 5) on the cover of the crank mechanism (item 9), lubricate, insert in the crankcase (item 6). Also see Chapter 11, Maintenance.



- 6.14.5 Place guide piston (item 11) on connecting rod. Use piston pin (item 12) to connect connecting rod to guide piston (item 11).



- 6.14.6 If the piston pin (item 12) must be pressed into the guide piston (item 11), no pressure may be applied to the connecting rod. The crankcase with the crank mechanism must be set up under a hand press in such a way that the connecting rod is not destroyed.



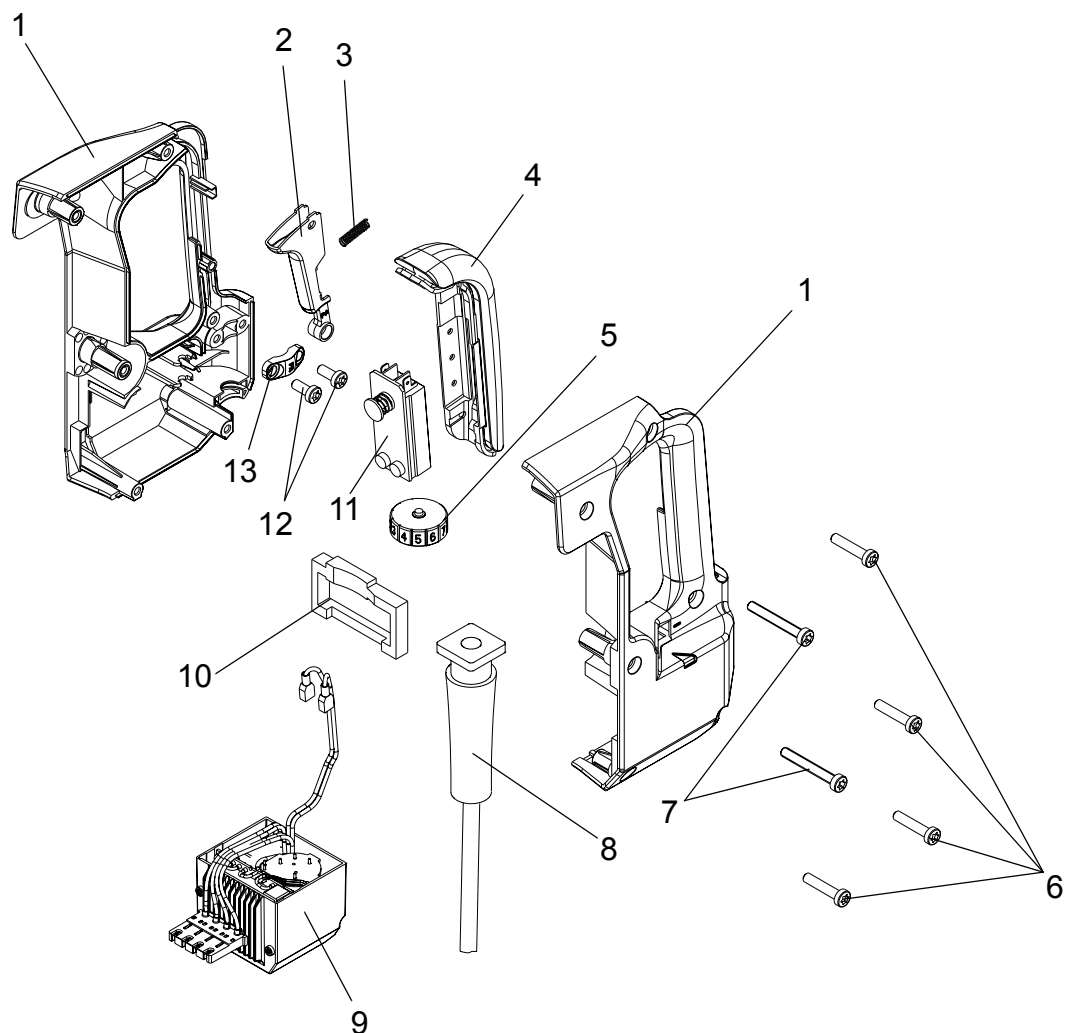
- 6.14.7 Insert fillister head screws (item 1) (TX 40) and tighten them (torque 10 Nm). Fillister head screws (item 1) are bonded, see section 8.2.



Note: Lubricate crankcase, see chapter 11. Push percussion piston onto guide piston (item 11). Lightly grease percussion piston, see section 8.1.

- 6.14.8 Insert damping rings (item 8) and damping supports (item 7).
- 6.14.9 Carry out the instructions in section 6.10, Assembly of cylinder housing.
- 6.14.10 Carry out the instructions in section 6.6 or 6.8, Assembly of tool holder.

6.15 Disassembly of handle and inverter



Item Designation

1	Paired handle	11	Switch
2	Switch guide	12	Fillister head screw
3	Compression spring	13	Clamp
4	Handle back		
5	Thumbwheel		
6	Fillister head screw		
7	Screw		
8	Cable support sleeve		
9	Inverter		
10	Sealing member		

- 6.15.1 Open the handle by means of 6 screws (items 6 & 7) (screwdriver TX 25). Remove the upper part of the handle. Remove thumbwheel (item 5).



- 6.15.2 Remove handle back (item 4), pull out the switch (item 11) and disconnect from the inverter cables. Release the fillister head screws (item 12) from the cord grip and remove with clamp (item 13). The lower part of the handle can be removed from the hammer.

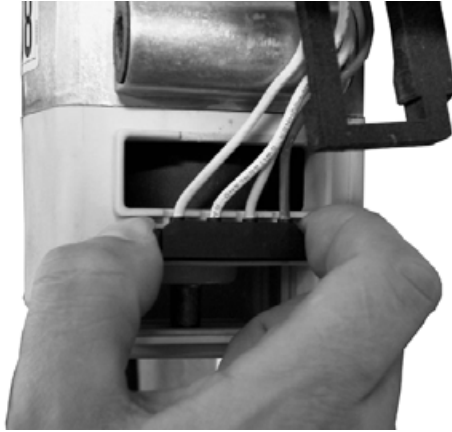


- 6.15.3 If the electric cable is defective, it can be disconnected from the switch. To do this, release the two clamp screws in the switch (item 11).

- 6.15.4 The switch guide (item 2), compression spring (item 3) and lower handle can be removed.



- 6.15.5 Disconnect the inverter (item 9) from the motor. Carefully remove the inverter plug (item 9) from the stator. Remove the sealing member (item 10). The inverter (item 9) can be removed from the handle.



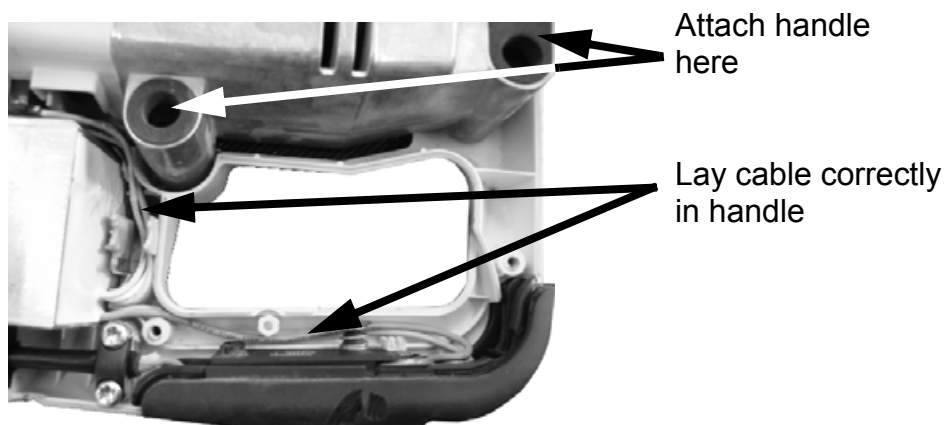
6.16 Assembly of handle and inverter

- 6.16.1 Once the defective parts have been replaced, assembly proceeds in the reverse order.
- 6.16.2 Pull sealing member (item 10) over the cable. Insert the 4-pin plug of the inverter (item 9) in the stator. Attach the sealing member (item 10). Attach the lower part of the handle (item 1) to the crankcase.
- 6.16.3 Attach both electric cables of the inverter (item 9) to the switch (item 11). Attach both cables of the power supply line (item 8) to the switch (item 11).
- 6.16.4 Place the switch (item 11) in the handle back (item 4) and attach both parts together to the handle (item 1).



Caution: Make sure the cables are positioned correctly. They must not be clamped down upon when closing the handle.

- 6.16.5 After attaching the handle back (item 4), lay both cables carefully in the handle. This also applies to the cables running from the inverter to the stator, which must be positioned under the thumbwheel (item 5) in the handle (item 1).



- 6.16.6 Screw in cord grip with clamp (item 13) and screws (item 12).
- 6.16.7 Install switch guide (item 2) with the compression spring (item 3). Insert thumbwheel (item 5).



- 6.16.8 Attach the upper part of the handle (item 1) to the lower part. Make sure the cables are not pinched. Attach the 6 screws (items 6 & 7).

7. Electrical inspection

Since the electric hammer is double insulated, there is no green-yellow grounded conductor in the power cable. The hammer conforms to class rating II.

According to DIN VDE 0701 and VDE 0113, the following inspections are required before, after and during maintenance of Wacker electrical devices:

1. Visual check
2. Measurement of insulating resistance
3. Electric strength test
4. Functional check

The following is a detailed explanation of each test:

Visual check:

Make sure that important parts of the device are neither visibly damaged or manifestly inappropriate for the device. These parts include the housing, cover and connection points. All operational equipment pertaining to the machine must be present. The housing must be in perfect condition, especially for devices with class rating II (protective insulation). Check flexible supply cables, including supplied unit supply cables, for external defects. In addition, the device must carry the required inscriptions, e.g. nameplate.

Measurement of insulating resistance with testing instrument SK 21:

Connect the device to be tested to the test line.

Insulation measurement must be carried out on the control panel after repairs and before connection. The value may not be fallen below!

For devices of protection class II (double insulated) = 2 Mega Ohm

The measuring device must show higher values!

Electric strength test with testing instrument UH 270:

Carry out all tests with the switch switched on.

The test is carried out with approx. 3 seconds of high voltage **between touchable metal parts (e.g. cylinder housing, crankcase, tool holder)** and the supply cables (pins from plug) - not from pin to pin, as that would destroy the inverter.

Test before repairs and before connecting to the control panel:

Device belonging to protection class II with 500 volts.

During repairs; after cleaning; before assembly:

Stator windings:	between packet and winding connection	1000 volts
------------------	---------------------------------------	------------

Rotor:	between aluminium packet and shaft	1000 volts
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Before repairs and before connecting to the control panel:

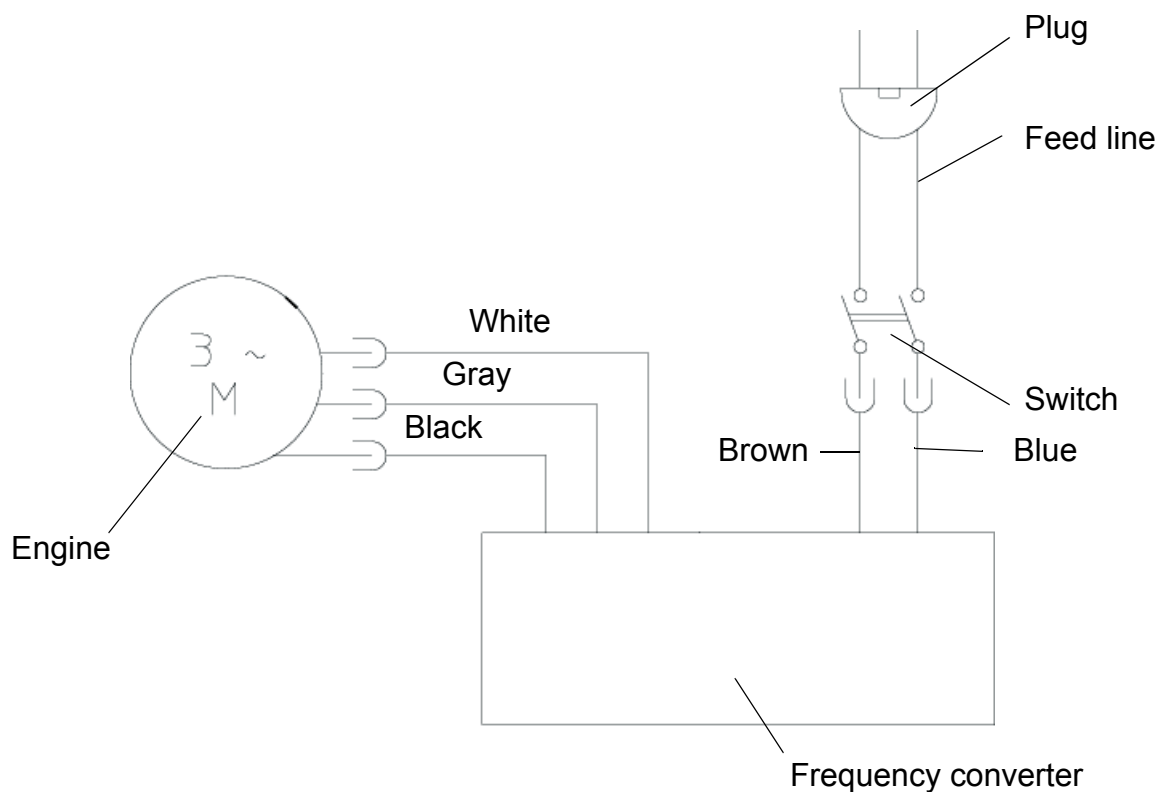
Device belonging to protection class II with 3500 volts.

Functional check: After maintenance has been performed, a functional test must be carried out. The unit must be operated according to the specifications set forth in the operating instructions. Check current consumption. After maintenance work is carried out, all inscriptions must be present on the unit.

Final acceptance:

Observe the local rules and regulations.

7.1 Electric wiring diagram



The frequency converter was installed with a yellow cable. This cable is no longer required.

8. Sealants, lubricants and adhesives

8.1 Lubricants

8.1.1 Crank mechanism lubricant:

Attach O-ring (see 6.14, item 5) to bearing cover (see 6.14, item 2) and grease with approx. 1.5 cm³ UNIREX N2.

Grease crank mechanism (see 6.14, item 11) through lubrication borehole in crankcase (see 6.14, item 6) with UNIREX N2 and turn connecting rod several times.

Needle bearing, see section 6.12, lubricate item 11 with Unirex N2.

8.1.2 Lubrication percussion system:

Grease crankcase (see 6.14, item 6) with UNIREX N2, approx. 5 g in the area of the beveled gearing (see 6.14, item 11).

Grease guide piston borehole (see 6.14, item 13) with UNIREX N2.

Lightly grease cylinder housing borehole (see 6.10, item 1) and percussion piston (see 6.0, item 3) with UNIREX N2, assemble both parts and attach to guide piston (see 6.4, item 13).

8.1.3 Lubrication rotor:

Lightly grease thread in rotor with UNIREX N2 (see 6.12, item 6).

8.2 Adhesives

8.2.1 Adhesive for crankcase:

Lubricate bearing carrier for deep groove ball bearing (see 6.12, item 2) with OmniFit 230 L and press deep groove ball bearing (see 6.12, item 2) into crankcase (see 6.12, item 6) with hand press.

Sprinkle the boreholes in the crankcase (see 6.14, item 6) for the 4 fillister head screws (see 6.14, item 1) with OmniFit 230 L.

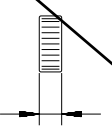
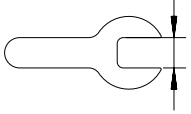
8.3 Sealants

8.3.1 Sealant for cylinder housing:

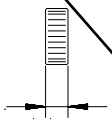
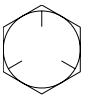
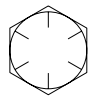
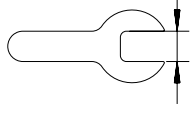
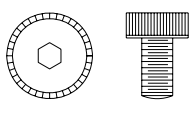
Seal crankcase face surface on cylinder housing with OmniVisc 1002.
Remove excess sealing compound.



9. Torques

Type 	 8.8		 10.9		 12.9					
	ft lb	Nm	ft lb	Nm	ft lb	Nm	inch	Met.	inch	Met.
M3	*11	1.2	*14	1.6	*19	2.1	7/32	5.5	-	2.5
M4	*26	2.9	*36	4.1	*43	4.9	9/32	7	-	3
M5	*53	6.0	6	8.5	7	10	5/16	8	-	4
M6	7	10	10	14	13	17	-	10	-	5
M8	18	25	26	35	30	41	1/2	13	-	6
M10	36	49	51	69	61	83	11/16	17	-	8
M12	63	86	88	120	107	145	3/4	19	-	10
M14	99	135	140	190	169	230	7/8	22	-	12
M16	155	210	217	295	262	355	15/16	24	-	14
M18	214	290	298	405	357	485	1-1/16	27	-	14
M20	302	410	427	580	508	690	1-1/4	30	-	17

* = in lb

Type 	 SAE 5		 SAE 8							
	ft lb	Nm	ft lb	Nm	inch	Met.	ft lb	Nm	inch	Met.
No. 4	*6	0.7	*9	1.0	1/4	-	*12	1.4	3/32	-
No. 6	*12	1.4	*17	1.9	5/16	8	*21	2.4	7/64	-
No. 8	*22	2.5	*31	3.5	11/32	9	*42	4.7	9/64	-
No. 10	*32	3.6	*45	5.1	3/8	-	*60	6.8	5/32	-
1/4	6	8	9	12	7/16	-	12	16	3/16	-
5/16	13	18	19	26	1/2	13	24	33	1/4	-
3/8	23	31	33	45	9/16	-	43	58	5/16	-
7/16	37	50	52	71	5/8	16	69	94	3/8	-
1/2	57	77	80	109	3/4	19	105	142	3/8	-
9/16	82	111	115	156	13/16	-	158	214	-	-
5/8	112	152	159	216	15/16	24	195	265	1/2	-
3/4	200	271	282	383	1-1/8	-	353	479	5/8	-

1 ft lb = 1.357 Nm

1 inch = 25.4 mm

10. Tools

10.1 Forging

When it becomes necessary to reforge the tools, care should be taken that only that part of the tool that needs reforging is heated. Moreover, it is important that the heat is increased slowly and that it is constantly watched, otherwise heat cracks are likely to occur on hardened tools.

Forging temperature: 800 °C - 1000 °C bright cherry-red - yellow

The tool should be forged within these limits and, if necessary, heated repeatedly. A temperature below 800 °C may cause tension cracks, whereas when the temperature exceeds 1000 °C the steel is overheated and ruined. After forging, the tools should be quenched in an ash- or sandbox. Do not harden the tools before they have cooled.

10.2 Hardening

Heat point or blade in direction of tool shank so that it becomes a cherry-red colour (780 °C - 810 °C), over the shortest distance possible (approx. 30 - 40 mm), then quench in water of approx. 20 °C while moving the tool to and fro.

10.3 Tempering

Smear blade with lubricating gel. Heat shaft to approx. 220 °C. The stored heat is transferred to the blade, changing its colour.

Tempering colour:

golden-brown - for soft stone

white-yellow - for hard stone

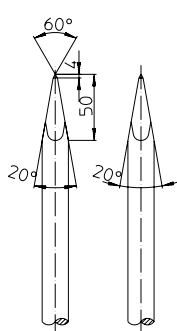
When the tempering colour is reached, immediately quench the tool in water.

10.4 Grinding

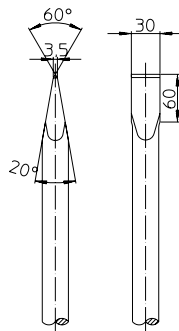
Sharpen the insert tools on grinding wheels, preferably sandstone, employing sufficient cooling water. The edges should not be allowed to turn blue as the hardness of the tools will be affected. Take care to achieve the proper cutting edge and pointed angle. The harder the material to be cut, the greater the angle should be.

10.5 Reforging of tools

Tools made of water-temperable steel - C70W2 - can be forged, hardened and ground.



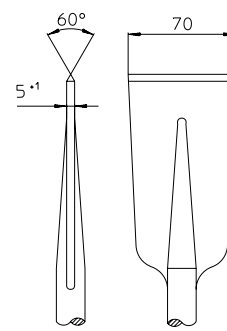
Point chisel



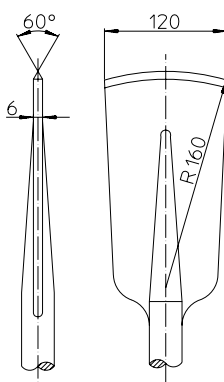
Flat chisel



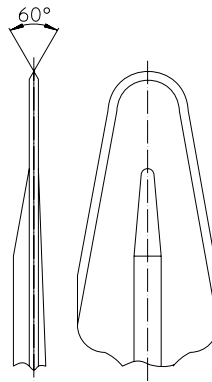
Blank



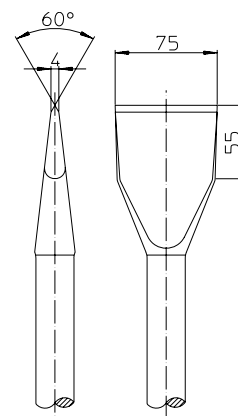
Plaster chisel



Spade

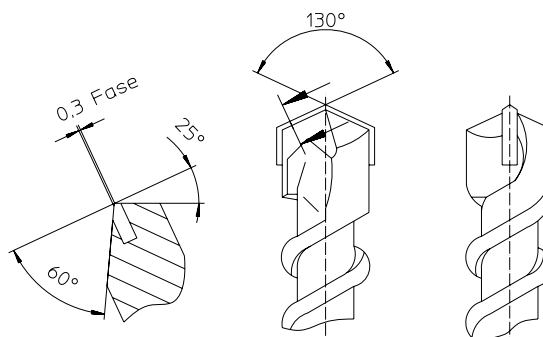


Pointed spade



Asphalt cutter

Tools with hard metal bits may only be sharpened on emerywheel machines.



Carbide-tipped twist drill

11. Maintenance

11.1 Maintenance schedule

Check all external screw connections for tight fit approx. 8 hours after initial operation.		
Component	Maintenance work	Maintenance interval
Feed line	Check for perfect condition - if cable is defective, replace.	Daily
Miscellaneous	Fan slits dirt-free - clean if necessary.	
Tools	Check the shafts and cutting edges - if necessary, sharpen, reforge or replace.	
Miscellaneous	Regrease via grease nipples.	20 hours
Tool holder bushing	Check for wear - change if necessary.	Monthly
Miscellaneous	Check cheese head screws of housing for tightness - retighten if necessary (25 Nm).	80 hours
Miscellaneous	Regrease crankshaft drive.	600 hours

11.2 Maintenance and lubrication

11.2.1 General instructions

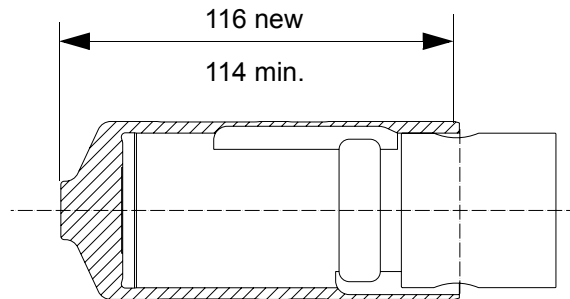
Keep hammer and tools clean. For proper repair work it is necessary to remove old lubricant from all components.

11.2.2 Mechanical part

- * Regreasing: After every 20 hours of operation, moderately grease crank mechanism and percussion system via lubricating nipple situated on crankcase. Use special grease (see technical data).
- * Check tool holder bushing for wear. The tool may have a play of max. 6 mm at a distance of approx. 200 mm from the entrance. If the bushing is worn to a greater degree, replace it to avoid damage and operational failure.

11.2.3 Percussion piston and guide piston

The percussion piston must be replaced when approx. 2 mm of the impacting tip has been worn away.



Measurement data for wearing limits of interior percussion piston and exterior guide piston are not possible, since they are in the range of a hundred places and defects of ovality come into play.



Inspection of both parts in grease-free state:

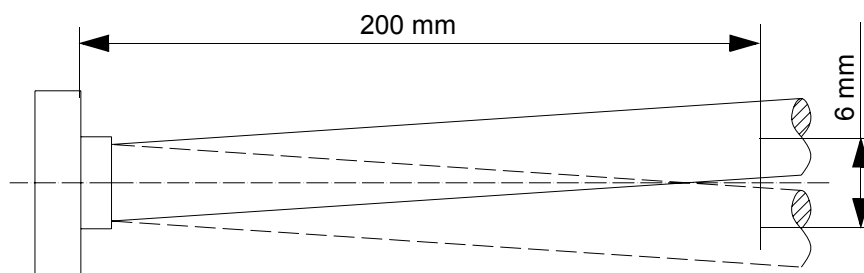
When plunging the guide cylinders into the percussion piston, there must be a noticeable resistance in the lower area, caused by a pent-up air cushion.

Greased parts react better since the grease film provides additional sealing.

11.2.4 Tools

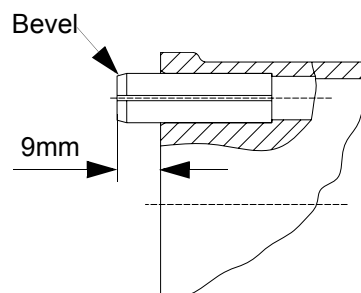
The performance of the hammer is strongly influenced by the state of the breaking and drilling tools. Therefore, only sharp tools in perfect condition should be used. Inappropriate tools, dull tools or tools with worn shanks can lead to overload and consequent damage to the hammer.

Check for worn tool shanks on a tool with a new tool holder and vice versa. If the play is greater than 6 mm for a distance of 200 mm (see illustration), the worn part must be replaced.



11.2.5 Dowel pin in cylinder housing

When the dowel pin is worn, it must be replaced. When replacing it, pay attention to the depth of insertion as well as the bevel position. See illustration.



12. Diagram

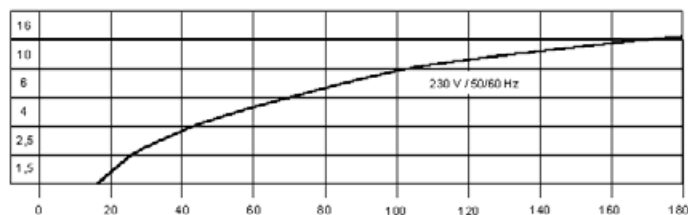
Selection of required cross section for extension of cables and power lines

This procedures takes into consideration:

- * The ohmic and inductive resistance of the line with an admissible loss of voltage of 5 % und $\cos \phi = 0.8$ as per voltage-frequency-curve.
- * The admissible warming-up of the lines as per VDE standard (table of required minimum cross section).

Voltage-frequency-curve

Cross-section area of cable in mm^2



Length of cable in m

Input cable cross-section	Maximum length of power supply cable
1,5 mm^2	26 m
2.5 mm^2	44 m
4 mm^2	70 m
6 mm^2	104 m
10 mm^2	171 m

Electric dimensioning current $I = 7.5 \text{ A}$

13. Troubleshooting

Cause	Remedy
Input voltage too high (> 300 V) or too low (< 170 V)	Make sure to have the correct voltage. Check extension cable for sufficient conductor cross section
Inverter temperature too high	Let equipment cool off
Supply cable interruption	Check supply cable incl. clamp contacts and replace if necessary
Switch defective	Replace
Broken cable between inverter and switch	Replace cable (incl. plug) with inverter-switch repair set No. 0125290
Inverter electronics defective	Replace inverter
Broken cable between inverter and stator	Replace cable (incl. plug) with inverter-stator repair set No. 0125291
Stator defective	Replace stator
Blocked percussion system: * Due to high grease resistance because of low external temperature * Due to over-greasing * Due to seizing of moving parts (e.g. due to prolonged dry running) * Due to seizing of drill * Irregular dropouts	* Allow unit to warm up in warm environment (e.g. heated rooms) * Remove excessive grease from percussion system * Replace defective components * Blow out borehole, check for reinforcing steel * Completely remove yellow cable from inverter.

14. Notes

